



**University of  
Zurich**<sup>UZH</sup>

**Zurich Open Repository and  
Archive**

University of Zurich  
University Library  
Strickhofstrasse 39  
CH-8057 Zurich  
[www.zora.uzh.ch](http://www.zora.uzh.ch)

---

Year: 2009

---

## **Learning From Others The Diffusion of Hospital Financing Reforms in OECD Countries**

Gilardi, Fabrizio ; Füglistner, Katharina ; Luyet, S

**Abstract:** The increase in health care expenditures is a major problem of all welfare states. To counter this trend, since the early 1980s, most OECD countries have changed the way hospitals are financed. Although these reforms are certainly linked to country-specific factors, the authors' main argument is that they are in part due to a diffusion process: Policy change in one country is influenced by previous changes in other countries. More specifically, the authors argue that policy makers learn from the experience of others. Using an original data set and event-history methods to test arguments, their results show that policy change is more likely when the existing policy is ineffective and when the experience of other countries suggests that the reform leads to the desired results. In addition, the authors find that the effects of learning grow over time and that early adopters tend to be countries with few veto players.

DOI: <https://doi.org/10.1177/0010414008327428>

Posted at the Zurich Open Repository and Archive, University of Zurich

ZORA URL: <https://doi.org/10.5167/uzh-19673>

Journal Article

Accepted Version

Originally published at:

Gilardi, Fabrizio; Füglistner, Katharina; Luyet, S (2009). Learning From Others The Diffusion of Hospital Financing Reforms in OECD Countries. *Comparative Political Studies*, 42(4):549-573.

DOI: <https://doi.org/10.1177/0010414008327428>

# Learning from others: The diffusion of hospital financing reforms in OECD countries\*

Fabrizio Gilardi<sup>†</sup>   Katharina Fuglister<sup>‡</sup>   Stéphane Luyet<sup>§</sup>

Forthcoming 2008, *Comparative Political Studies*

## Abstract

The increase in health-care expenditures is a major problem of all welfare states. To counter this trend, since the early 1980s most OECD countries have changed the way hospitals are financed. While these reforms are certainly linked to country-specific factors, our main argument is that they are in part due to a diffusion process: policy change in one country is influenced by previous changes in other countries. More specifically, we argue that policymakers learn from the experience of others. We rely on an original data set and use event-history methods to test our arguments. Our results show that policy change is more likely when the existing policy is ineffective and when the experience of other countries suggests that the reform leads to the desired results. In addition, we find that the effects of learning grow over time, and that early adopters tend to be countries with few veto players.

---

\*Previous versions of this article were presented at the 2006 and 2007 APSA annual meetings, at the 2006 ECPR joint sessions of workshops, and at the 2006 ESPAnet annual conference. We thank the participants in these conferences and especially Sarah Brooks, John Clarke, and Lane Kenworthy, as well as CPS' reviewers, for helpful comments. We also thank all the country experts who helped us with data collection. The financial support of the Swiss National Science Foundation (grant no. 100012-105763/1) is gratefully acknowledged. The usual disclaimer applies.

<sup>†</sup>Institut d'Etudes Politiques et Internationales, University of Lausanne (Switzerland), and Weatherhead Center for International Affairs, Harvard University. Email: [fgilardi@wcfia.harvard.edu](mailto:fgilardi@wcfia.harvard.edu). URL: [www.fabriziogilardi.org](http://www.fabriziogilardi.org).

<sup>‡</sup>Institut d'Etudes Politiques et Internationales, University of Lausanne (Switzerland). Email: [katharina.fuglister@unil.ch](mailto:katharina.fuglister@unil.ch).

<sup>§</sup>Institut d'Etudes Politiques et Internationales, University of Lausanne (Switzerland). Email: [stephane.luyet@unil.ch](mailto:stephane.luyet@unil.ch).

# 1 Introduction

This article argues that countries influence each other in the development of social policies, which, as a result, diffuse internationally.

Few scholars believe that national social policies are independent of each other. However, this assumption is implicit in most studies, even though Collier and Messick (1975, 1272) contended more than 30 years ago that welfare states have developed interdependently, and despite the important literature on the diffusion of welfare policies in US states (for example, Berry, Fording, and Hanson 2003; Berry and Baybeck 2005; Volden 2006). Some authors have recently started to take this claim seriously (for example, Swank 2006; Jahn 2006; Brooks 2005; Brooks 2007; Franzese and Hays 2006), but these works are exceptions, and the literature is still predominantly concentrated on the issues of retrenchment, the role of globalization, and the old vs. new politics of the welfare state (for example, Pierson 2001b; Korpi and Palme 2003; Allan and Scruggs 2004; Brady, Beckfield, and Seeleib-Kaiser 2005). The main goal of this article is to demonstrate that diffusion is an important driver of welfare state reform and should therefore occupy a more prominent place in the research agenda of the field.

While our theoretical arguments are general and can be applied to a wide range of social policies, we focus empirically on the health care sector, which the literature has often neglected in favor of pension and labor market policies (Hacker 2004a, 693). More specifically, we study whether and how hospital financing reforms in OECD countries have been characterized by a diffusion process. According to Simmons, Dobbin, and Garrett (2006, 787), “[i]nternational policy diffusion occurs when government policy decisions in a given country are systematically conditioned by prior policy choices made in other countries”<sup>1</sup>. In particular, we argue that the spread of hospital financing reforms has been partly driven by learning, defined as a process whereby policy-makers use the experience of other countries to update their beliefs on the consequences of a policy (Meseguer 2004; Meseguer 2006b). Our dependent variable is the decision to introduce prospective-payment methods based on patient-classification systems, whereby hospitals receive a lump sum according to the type of pathology treated. Our study, therefore, distinguishes itself from most of the welfare state literature and many diffusion studies by *not* looking at aggregate figures such as spending, but rather at the decisions that lead to those figures.

Our main result is that the adoption of hospital financing reforms is

---

<sup>1</sup>For similar definitions, see Simmons and Elkins (2004), Meseguer (2004), Braun and Gilardi (2006).

influenced by their consequences in other countries. Policy change is more likely when the experience of others shows that patient-classification systems lead to better control of public expenditures on health. In other words, these policies have diffused in a learning process. Furthermore, contrary to our expectations we find that learning has become *more* important over time: the experience of others becomes more influential as the diffusion process unfolds. Other findings are that the adoption of hospital financing reforms is more likely when the existing policy is not effective, and that innovators tend to be countries where the institutional context favors policy change. The specificity of the reform that we study means that some of these findings do not necessarily transfer to other welfare policies. In particular, we expect domestic factors to play a more prominent role, both independently and as filters of diffusions, in areas that are highly politicized, such as labor market policies or pensions reform.

The article is structured as follows. Section 2 introduces hospital financing reforms and shows that they have spread across OECD countries. Section 3 presents theory and hypotheses, Section 4 discusses data and methods, and Section 5 reports the results of the statistical analysis and discusses their robustness. In the conclusion we elaborate on the implications of our findings for research on the welfare state and on diffusion.

## **2 Hospital financing reforms in OECD countries: the spread of patient-classification systems**

Since the early 1980s, health care expenditures have risen much faster than GDP. While in 1980 total expenditure on health represented 7.1% of GDP on average in core OECD countries, in 2000 this share had reached 9%, and in some countries, such as Switzerland, Germany, and the United States, had even passed the 10% threshold (OECD 2006). Similarly, public expenditure on health increased from 5.3% of GDP to 6.3% in the same period. This “context of permanent austerity” (Pierson 2001a) has exerted considerable pressures on public and private budgets, and has made cost containment in the health sector a priority for most governments. We focus here on reforms of hospital financing. While hospitals are only one part of the health care system, inpatient expenditures constitute a significant share of health expenditures. In 2000, on average they accounted for more than 44% of public expenditures and more than 35% of total expenditures on health in OECD countries (OECD 2006).

One of the major reforms in the hospital sector is the change from a retrospective to a prospective payment system. Whereas under a retrospective system providers are reimbursed after the delivery of services, for example on the basis of the number of hospital beds and average length of stay of patients, a prospective system determines payments before services are delivered. Patients are classified according to their pathology, and hospitals receive a pre-determined payment for each patient according to his or her “type”. For this reason, this kind of financing is called a “patient-classification system”. Classifying patients in specific groups makes it possible to analyze and compare the medical treatments of different patients and their resource consumption.

The introduction of patient-classification systems has two main objectives. The first relates to management: patient-classification systems create incentives for hospitals to increase efficiency, control costs and reduce the length of stay of patients. Since they receive a fixed sum for each type of patient, hospitals have incentives to find the most efficient way to treat them. The second purpose of patient-classification systems is to increase the transparency of hospitals’ activity. The goal here is to allow third-party payers to compare in a systematic way the performance of hospitals on various dimensions such as quality and costs. Indirectly, this second use of patient-classification systems can be expected to increase the efficiency of hospitals through yardstick competition and benchmarking.

“Patient-classification system”, however, is a generic term. Several types have been developed since the first tests in the United States during the 1970s, including Diagnosis Related Group (DRG), Disease Staging (DS) and Patient Management Category (PMC). In practice, DRGs are the patient-classification system that has been most widely employed. In contrast to other patient-classification systems, the assignment to a DRG is based primarily on the main diagnosis of a patient as well as on the presence or absence of a surgical intervention.

The development of DRGs began in the late 1960s at Yale. Their first application on a large scale dates back to 1983, when the Centre for Medicare and Medicaid Services (CMS) at the Department of Health and Human Services adopted DRGs as a Medicare prospective-payment system<sup>2</sup>. With the implementation in the Medicare program, the CMS became the owner of the current DRGs definitions and therefore also became responsible for their maintenance and modification. Under contract with the CMS, the company 3M Health Information Systems has performed all revisions of the DRGs definitions and related software and documentation. Whereas the original

---

<sup>2</sup>This first version of DRG is called HCFA-DRG, referring to the Health Care Finance Administration that first established it.

definitions developed at Yale encompassed all types of patients in acute care hospitals, the modification and further development of DRGs definitions used within Medicare concentrated, quite naturally, on problems relating to the elderly. This became an important limitation of applications of the DRGs system outside the Medicare program, that is, for parts of the population other than the elderly. To address these problems, several variations of DRGs have been developed, such as the Refined-DRG, the All-Patient DRG (AP-DRG) or the All-Patient Refined DRG (APR-DRG).

Since their introduction in the Medicare program, DRGs have been applied in different domains. Hospitals have used them as the basis of internal management systems, Medicaid programs and Blue Cross plans for the payment system, and State data commission for state-wide comparative reporting. DRGs were not only used in the US health care system, but spread to Canada, Australia/New Zealand, Europe and Asia. Since the early 1980s, several European countries have tested the original DRG version (HCFA-DRG) either for pure research or for management or resource allocation purposes. Most early projects were conducted with the methodological support of either Yales Health Services Management Group (led by Professor Robert Fetter) or the company 3M Health Information Systems, from which some countries eventually bought classification systems such as the All-Patient DRG or the International Refined DRG. Several major versions of DRGs are currently used. They differ in the way they define groups, the number of groups they distinguish, and the type of patient they take into account. Some countries (for example Spain, Portugal, and Italy) have adopted an existing version of DRG. Other countries have adapted an existing DRG system to their specific needs. Cases in point are Nordic countries, which together developed the NordDRGs system, and its country-specific variations, namely, France (GHM, EfP), and Australia (AN/AR DRG). The Australian system was then imported to Germany and adapted to the characteristics of that country (G-DRG). In turn, the German system will from 2008 be implemented, with adaptations, in Switzerland (Swiss-DRG). Finally, in some countries existing DRG systems have been tested but discarded, and country-specific DRGs have been developed instead. This has been the case in Austria (LDF system), Canada (CMG), Netherlands (DBC) and the UK (HRG).

The introduction of DRGs into a particular hospital system is complex and resource-intensive, as the chosen DRG definitions must fit the national hospital database and be adapted to culturally-specific medical treatments. In addition, the use of DRGs for resource allocation implies the development and regular update of grouper software, cost weights and information systems. The introduction of a common hospital reform at the national level is

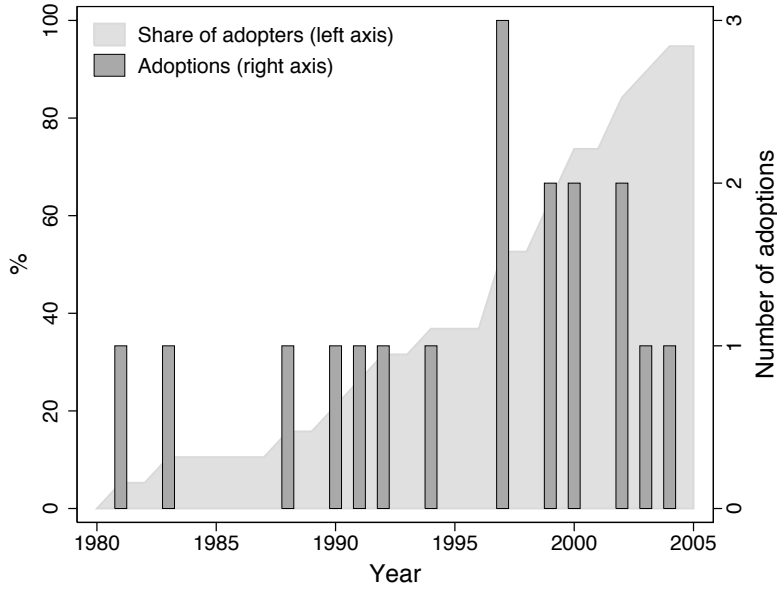


Figure 1: The spread of patient-classification systems in 19 OECD countries.

made even more complicated by the facts that many health care systems are characterized by a high degree of decentralization and that hospital financing is often organized at the local level, at least in part. Nevertheless, DRGs have spread internationally, as shown in Figure 1.

### 3 Theory and hypotheses

How can the spread of hospital financing reforms shown in Figure 1 be explained? Our arguments are based on a theoretical model of policy change and diffusion put forward by Braun and Gilardi (2006)(see also Braun, Gilardi, Füglistner, and Luyet 2007). The basic idea is that policy change occurs if its expected utility is greater than that of the status quo. The expected utility, in turn, depends on two factors: payoffs and effectiveness. First, some policies are more attractive than others, either in terms of policy preferences (for example, policy-makers may prefer private provision of health care on ideological grounds) or in terms of electoral rewards (policy-makers may refrain from reforming the health care system because they fear electoral sanctions). Second, some policies are more effective than others in achieving their objectives. For example, broad structural trends such as population ageing, the transformation of household structures, and post-industrialization have

made existing welfare state arrangements less and less sustainable (Pierson 2001c). Of course, policy-makers may value existing welfare state arrangements highly (either because they are in line with their policy preferences, or because they are electorally rewarding, or both), but nevertheless be under pressure to reform them because the status quo is ineffective (for example, it places an excessive burden on public budgets). Alternatively, ineffective policies can be perpetuated if they enjoy high popularity or are in line with the preferences of policy-makers. Nevertheless, it can be expected that, all else equal, the probability of policy change grows with the ineffectiveness of the status quo. Our first hypothesis is therefore:

H1: the probability of policy change increases as the effectiveness of the existing policy decreases.

Of course, not only the characteristics of the status quo are important, but so also are those of the alternative policy. In particular, policy-makers try to assess the consequences of a change for both policy and political outcomes. If the new policy is introduced, will there be positive effects on, for example, public budgets? And what will be the electoral consequences? One way for policy-makers to answer such questions is to look at the experience of others. If other countries have already introduced the new policy, their experience could help policy-makers assess the consequences of policy change in their own country. In other words, policy-makers can learn from others. We define learning as a process whereby policy-makers use the experience of others to update their beliefs on the consequences of policies (Meseguer 2004; Meseguer 2005; Meseguer 2006b; Meseguer 2006a). Learning is thus one of the forms that international interdependence can take, and is therefore one possible diffusion mechanism. Of course, learning is not the only diffusion mechanism: competition, cooperation, emulation, and norms can also be relevant (Simmons, Dobbin, and Garrett 2006; Braun and Gilardi 2006). For instance, countries can be influenced by other countries with which they are in competition for capital (Elkins, Guzman, and Simmons 2006), or by the symbolic properties of policies rather than their effects (Polillo and Guillén 2005). In this article, however, we concentrate on learning.

A growing literature has demonstrated that policies diffuse internationally. Countries have mutually influenced each other in a wide range of domains, such as foreign economic policy (Simmons and Elkins 2004), market-oriented reforms (Meseguer 2004; Meseguer 2006a; Henisz, Zelner, and Guillén 2005), public-sector downsizing (Lee and Strang 2006), tax policy (Swank 2006), pension reform (Brooks 2005; Brooks 2007), independent regulatory agencies (Jordana and Levi-Faur 2005; Gilardi 2005), central banks (Polillo



and Guillén 2005), and bilateral investment treaties (Elkins, Guzman, and Simmons 2006). On the other hand, the empirical evidence on learning is mixed. The foreign economic policies of successful countries (in terms of economic growth) tend to be more imitated than those of less successful examples (Simmons and Elkins 2004), and bilateral investment treaties are more likely to be signed if the experience of others shows that they help attract foreign investment (Elkins, Guzman, and Simmons 2006), but these effects are only moderately strong. Similarly, privatization and market-oriented reforms tend to more likely if the experience of others shows that they have positive effects on economic growth, but this finding is somewhat ambiguous (Meseguer 2004; Meseguer 2006a). These inconsistencies might be due to the fact that learning processes are more complex than it is usually assumed. Lee and Strang (2006), for instance, show that learning is strongly “theory-driven”: it influences policy change only if it is in line with prior beliefs<sup>3</sup>. Thus, international evidence that public-sector downsizing leads to strong economic performance has an impact on similar reforms at home because it is consistent with dominant views on the appropriate size of government; by contrast, evidence that it leads to weak performance is neglected. Analogously, evidence that upsizing leads to weak performance results in downsizing, but evidence that it leads to strong performance is not taken into account.

In this article we consider another form of complexity, namely, heterogeneity over time. The sociological diffusion literature (for an overview, see Strang and Soule 1998) argues that some practices progressively become socially valued, and through their adoption policy-makers can show that their actions are legitimate and thus protect themselves from criticism (Meyer and Rowan 1977). In extreme cases, a practice can even become taken for granted as the only appropriate solution to a given problem (Hannan and Carroll 1992). Independent central banks are a case in point: their spread has been due to their symbolic properties more than to their consequences for macroeconomic outcomes (McNamara 2002; Polillo and Guillén 2005). Therefore, sociologists argue that diffusion processes might be rational during their early stages, but social mechanisms become more and more relevant as the process unfolds, since symbolic aspects become more important.

On the basis of these considerations, we develop two hypotheses on learning:

---

<sup>3</sup>As Lee and Strang (2006, 904) summarize: “[i]n short, when theories and evidence come into conflict, theories win.”

H2: the probability of policy change increases with the effectiveness of the alternative policy, which policy-makers estimate by looking at its consequences in other countries.

H3: the effects of learning decline over time.

Finally, we develop quite simple arguments on the role of political factors. We do not expect partisan politics to play an important role in the adoption of patient-classification systems because the reform is very technical and has been perceived as such in most countries. By contrast, we expect the institutional context to matter. As is well known, certain institutional arrangements make policy change more difficult than others: the greater the number of actors whose agreement is necessary for a law to be passed, the higher the probability is that the status quo will prevail (Tsebelis 2002). While the reforms we consider are technical, they have been enacted through legislative change<sup>4</sup> and veto players can be expected to matter, although probably less than for more politicized decision. On the other hand, we expect institutions to be more constraining for innovators than for followers. As more examples become available and, possibly, the experience of others shows that the new policy is a good one, policy-makers may find it easier to push the reform through the various veto points. By contrast, innovators cannot rely on this sort of ammunition and might therefore be more constrained by a high number of veto players. Our hypothesis is therefore the following:

H4: veto players make policy change more difficult, but more so for innovators than for followers.

We now turn to the discussion of data and methods, and we will then move to the statistical analysis.

## 4 Data and methods

The dependent variable of the analysis is change in hospital financing through the introduction of some form of patient-classification systems (see Section 2). We focus on reforms involving the imposition of patient-classification systems to all hospitals by national authorities (possibly with extensive transition periods). We have taken into account binding decisions enacted through

---

<sup>4</sup>The operationalization of the dependent variable will be discussed in Section 4.

legislation, both for the original introduction of the reform and for successive changes aimed at revising or extending it. On the other hand, we have excluded cases where central authorities took administrative steps towards the introduction of patient-classification systems, but left considerable freedom to sub-national units in the implementation of the decision. We have also excluded decisions with only local scope, as well as pilot projects carried out in just a few hospitals. Therefore, the dependent variable takes the value of 1 if patient-classification systems are introduced in a given country or are reformed through legislation, and 0 otherwise. Given that several decisions are possible, we keep observations after the first introduction. We have collected empirical information on the timing of these reforms in 19 OECD countries between 1980 and 2005 through case studies.

The coding of the dependent variable can be illustrated with the example of Belgium. After a number of pilot studies, patient-classification systems were introduced through national legislation in 1995 and progressively implemented throughout the country. In 2002 another hospital financing reform was passed which introduced new methods to assign patients to the various categories in the classification schemes. This decision deepened the implementation of the original reform, since it improved the adaptation of the schemes to the specificities of the Belgian health care system. For the case of Belgium, we have coded the dependent variable 1 in 1995, marking the introduction of patient-classification system in Belgian hospitals, and in 2002, when the system was reformed. For the other years, the dependent variable takes the value of 0.

Given this operationalization of the dependent variable, we model the process primarily through a logit, which is an appropriate choice for event-history data provided that the issue of time dependence is dealt with (Beck, Katz, and Tucker 1998). To control for time dependence, we have first run a logistic regression with time dummies only, and computed predicted probabilities for decisions to introduce or reform patient-classification systems. This gives the discrete baseline hazard, which we have then smoothed using a locally weighted smoothing function (lowess) with a 40% bandwidth<sup>5</sup> (Box-Steffensmeier and Jones 2004, 76–77; Beck and Jackman 1998, 614–617). In the analysis we use principally the smoothed baseline hazard, but we also employ the discrete hazard (which fully takes out time dependence) as a control.

In addition, we also include a variable counting the number of reforms that have been introduced in a country, which obviously takes the value of

---

<sup>5</sup>The bandwidth refers to the share of data used to construct the smoothed function. The higher the share, the more smoothed the function becomes.

0 before the first introduction. This is needed to control, at least in part, for previous decisions in the context of multiple or repeated events (Beck, Katz, and Tucker 1998, 1272). However, the assumption here is that the first and any subsequent decisions have the same nature, which is not necessarily realistic. Therefore, we have pursued also two additional modeling strategies as robustness checks. Firstly, we have modeled successive introductions as *multiple* events through an ordered logit, which does not assume that the second reform has the same nature as the first, and explicitly treats them as *different* events. Although within the logit framework multiple events are usually modeled through a multinomial logit (Box-Steffensmeier and Jones 2004, 173–175), the ordered logit is a better alternative in our case because successive reforms have a logical hierarchy. Not only are there “first”, “second”, and in a couple of cases even “third” reforms, but subsequent reforms have built on and expanded original reforms. There is thus a clear order among them. Unlike the multinomial logit, the ordered logit takes this into account.

Secondly, we have modeled successive introductions as *repeated* events, that is, events of the same type that can occur more than once. This is best done through a conditional Cox model, whose advantage is to model explicitly the sequence of the events (Box-Steffensmeier and Jones 2004, 158–162; Box-Steffensmeier and Zorn 2002). Concretely, the model allows baseline hazards to vary across events. On the other hand, a single set of coefficients is estimated. In our case, all decisions can be conceptualized as events of the same type (legislative decisions), but on the other hand their sequence matters. In particular, a second reform cannot be introduced unless a first has already been enacted, and the view that all reforms need not have the same baseline hazard is realistic. The conditional Cox model is therefore well suited to our data.

We will see in the next section that our results are robust to these alternatives. Given that using more complex modeling strategies does not alter the findings, we will focus on logit models, and we will comment only briefly on the other options. Full results are available upon request.

Turning now to the independent variables, we measure the effectiveness of the existing policy (H1) through the recent trend in public expenditures on health. Cost containment has been one of the major objectives of all governments, and hospital expenditures constitute a significant share of public expenditures on health: in 2000, the OECD average was more than 35% (OECD 2006). Therefore, increased efficiency in the hospital sector, which is one of the major aims of patient-classification systems, can be expected to help control the rise of public expenditures on health; conversely, patient-classification systems can be seen as one of the solutions to control expen-

ditures. Our hypothesis is that the probability that patient-classification systems are introduced rises when the effectiveness of the existing policy is poor (H1). We operationalize this idea by looking at the recent trend in public expenditures on health (as a share of GDP) for each country: the more they rise, the lower is the effectiveness of the existing system. Conversely, the less they rise, and the more they decline, the more effective the existing system is, and pressures for change will be less important. Concretely, we have run rolling regressions of public expenditures on health (as a share of GDP) on time with a moving window of five years, and have taken the regression coefficients as measures of recent trends. The coefficients indicate how, on average, total expenditures evolved during the five-year period preceding the observation.

We also include measures for the effectiveness of patient-classification systems, that is, the alternative policy (H2). One way for policy-makers to determine whether patient-classification systems lead to better performance is to look at the experience of others: if countries that have introduced patient-classification systems are more able to control the rise of public expenditures on health, policy-makers could conclude that the reform will lead to the desired effects (H2). To operationalize this idea, we look at the correlations between patient-classification systems and public expenditures on health. Following Elkins, Guzman, and Simmons (2006), we regress, for every country and every year, the trend in public expenditures on health in *other* countries (during the previous five years) on a measure of the extent to which hospitals in those countries are financed through patient-classification systems. We measure this by applying a logistic transformation to the number of years since the introduction of patient-classification systems<sup>6</sup>. In most countries patient-classification systems were introduced progressively, and we assume that their effects will grow over time, but not in a linear way. The logistic transformation implies that the implementation of patient-classification systems starts slowly, reaches 50% after five years, and is almost complete after ten years, which is a quite realistic assumption.

We then use the coefficients of these regressions as measures of the conclusion to which policy-makers would come if they looked in a simple but comprehensive way at all available experiences at the national level<sup>7</sup>. If the coefficients of regressions of public expenditures trends on experience with

---

<sup>6</sup>The first year is coded  $-4$ , the second  $-3$ , and so on. The “experience” variable is then computed as  $\frac{e^x}{1+e^x}$ .

<sup>7</sup>Note that the coefficients are country-specific: Germany, for instance, is not included in the regressions that measure the link between the patient-classification systems and public-expenditure trends in “other” countries from Germany’s point of view. Obviously, Germany is included in the regressions from the perspective of all other countries.

patient-classification systems are positive, it means that patient-classification systems lead to an upward trend in total expenditures on health, while if the coefficients are negative patient-classification systems are associated with downward trends in this variable. Rational learners, however, take into account not only the average effect of policies on relevant outcomes, but also the uncertainty surrounding this effect (Meseguer 2006b). In statistical parlance, the width of the confidence interval around the coefficient should make a difference for rational learners: the narrower it is, the more informative the experience of others is. To capture this idea, we weigh the coefficients by the absolute value of the corresponding  $t$ -values. Since higher  $t$ -values mean that estimates are more precise, this procedure gives more weight to the experience of others when it is more consistent, and less weight when evidence is inconclusive.

If the learning hypothesis is correct, that is, if policy-makers update their beliefs on the effectiveness of the new policy by looking at the experience of others, then the probability that patient-classification systems are adopted should be higher when the experience of others points at a negative link between the reform and total expenditures on health. Therefore, the expected sign of the learning coefficient is negative.

As robustness checks, we have also employed the unweighted coefficients of the rolling regressions (which do not take uncertainty into account), and we have computed both the weighted and unweighted measures with three-year and seven-year trends.

Veto players (H4) are measured through the “political constraints” variable (*polcon3*) constructed by Henisz (2000, Henisz (2002)). In addition, we include a series of controls. Given the technical nature of the reform we do not expect partisanship to play an important role, but we include two dummies to control for it. The first takes the value of 1 if left parties control more than two thirds of government seats, while the second takes the value of 1 if right parties control more than two thirds of government seats; the baseline category is thus centrist governments. Data are taken from Armingeon, Leimgruber, Beyeler, and Menegale (2005). We also control for the level of total expenditures on health (as a share of GDP) and of public expenditures on health (as a share of total expenditures), with data taken from the OECD (2006).

## 5 Statistical analysis

The statistical analysis is reported in Table 1. Model 1 tests hypotheses 1 and 2. We see that the introduction of patient-classification systems is more

likely when the effectiveness of the current policy is weak. The more public expenditures on health rise, the higher is the probability of policy change. This is consistent with H1. By contrast, H2 does not seem to find support: the probability of change does not depend on the effectiveness of the alternative policy, estimated by looking at the experience of other countries. On the other hand, Model 2 tests H3, which states that learning effects decline over time, and finds that the interaction of learning and time is indeed significant. However, the positive sign of the learning coefficient and the negative sign of the interaction term mean that learning actually gains importance as the diffusion process unfolds. This result is unexpected but not unexplainable, as we will see in a while. Model 3 simply checks the robustness of the findings to the inclusion of the discrete baseline hazard, which fully controls time dependence. Model 4 tests H4, namely, that veto players constrain policy change, especially for early adopters. This hypothesis seems confirmed: political constraints have a negative impact on the introduction of patient-classification systems, but the effect declines over time, which means that the institutional context matters more for early adopters than for latecomers. Finally, Model 5 includes the discrete baseline hazard as a strong control for time dependence.

A series of additional analyses, not reported here due to space constraints but available upon request, show that these results are robust to alternative operationalizations and specifications. Firstly, we have employed the unweighted coefficients of the rolling regressions (which do not take uncertainty into account) in the operationalization of learning. Results are almost identical. Secondly, we have computed the learning and public expenditures trend variables using three- and seven-years moving windows (the main analysis relies on five-years periods). While findings on learning and the effectiveness of the existing policy are generally stable (although more so when using the seven-years period), the effect of political constraints seems to be more dependent on the operationalization of the other variables. We will take this into account in the interpretation. Thirdly, in order to better account for the repeated nature of the events we study, we have rerun the analyses using an ordered logit (which, as explained in Section 4, models *multiple* events) and a conditional Cox (which models *repeated* events). Results remain essentially unchanged, although in some models the political constraints variable (and sometimes also its interaction with time) is significant only at the 10% level. Finally, many of the innovators were Anglo-Saxon countries, and one could wonder whether our measure of political constraints does not actually capture the cultural similarities between those countries, and possibly the fact that ideas travel more easily among them. To check this, we have included a dummy variable taking the value of one for Anglo-Saxon countries as well

Table 1: Logit analysis of the adoption of hospital financing reforms.

	Model 1	Model 2	Model 3	Model 4	Model 5
Learning	0.083 (0.78)	3.571*** (3.86)	2.945*** (2.95)	3.582*** (3.74)	2.919*** (2.67)
Learning $\times$ Time		-0.581*** (3.93)	-0.472*** (3.03)	-0.578*** (3.79)	-0.465*** (2.77)
PEH <sup>a</sup> trend	4.087** (2.53)	5.752*** (2.88)	5.548** (2.50)	6.624*** (3.32)	6.293*** (2.84)
Political constraints	-0.213 (0.08)	0.259 (0.10)	-0.612 (0.25)	-24.793** (2.03)	-31.017** (2.12)
Polit. constr. $\times$ Time				1.276** (2.02)	1.567** (2.06)
Left government	-0.088 (0.16)	-0.266 (0.44)	-0.154 (0.25)	-0.270 (0.41)	-0.162 (0.23)
Right government	-0.988 (1.53)	-1.292* (1.77)	-1.073 (1.36)	-1.601** (2.27)	-1.459* (1.80)
TEH <sup>b</sup> (%GDP)	0.049 (0.16)	-0.032 (0.09)	-0.011 (0.03)	-0.011 (0.03)	0.021 (0.06)
PEH <sup>a</sup> (%TEH <sup>b</sup> )	0.005 (0.12)	-0.008 (0.17)	-0.000 (0.01)	-0.003 (0.06)	0.004 (0.09)
Baseline hazard <sup>c</sup>	57.123 (1.62)	19.060 (0.62)		31.385 (0.88)	
Baseline hazard <sup>d</sup>			34.301*** (3.94)		37.550*** (3.94)
Time		0.069 (1.16)	0.044 (0.69)	-0.531* (1.65)	-0.672* (1.85)
Previous decisions	-0.156 (0.68)	-0.307 (1.20)	-0.328 (1.10)	-0.418* (1.71)	-0.440 (1.48)
Constant	-5.478 (0.88)	-4.184 (0.65)	-5.201 (0.76)	6.626 (0.74)	7.923 (0.79)
Wald $\chi^2$	35.45	120.95	96.81	326.66	158.58
Countries	19	19	19	19	19
Observations	369	369	369	369	369

Robust z statistics in parentheses (for clustering on countries).

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

<sup>a</sup> Public expenditures on health. <sup>b</sup> Total expenditures on health.<sup>c</sup> Smoothed. <sup>d</sup> Discrete.



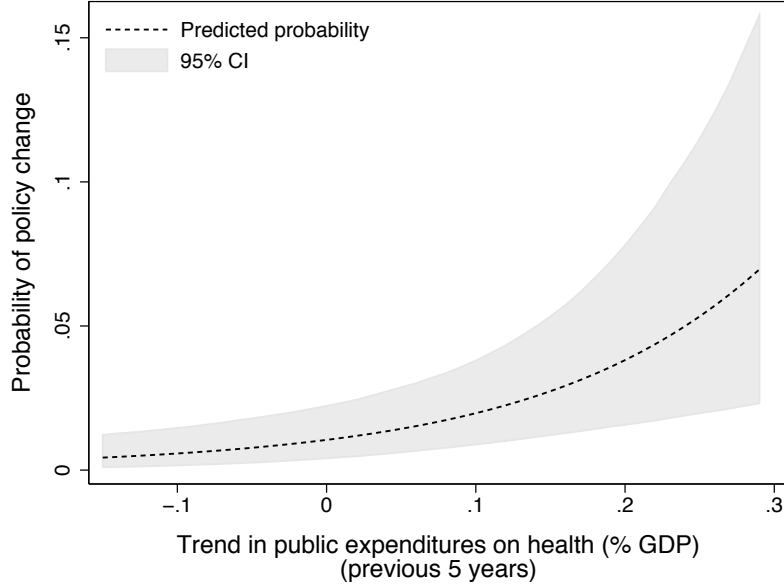


Figure 2: Predicted probability of policy change as a function of the effectiveness of the current policy.

as an interaction with time, in order to mirror our modelization of the role of political constraints. The Anglo-Saxon dummy is never significant, nor is its interaction with time. The other coefficients do not change.

These robustness checks allow us to be reasonably confident that our results do not hinge upon particular methodological choices. To interpret them properly, we need to look beyond coefficients. Figures 2-5 display more interesting and informative quantities. Figures 2 and 4 have been computed using Clarify (King, Tomz, and Wittenberg 2000), while Figures 3 and 5 show interaction effects and have been constructed following Brambor, Clark, and Golder (2006). All figures are based on Model 4.

Figure 2 illustrates how the probability of policy change varies as the effectiveness of the existing system declines (H1). The more positive the recent trend in public expenditures on health, the higher the likelihood is that patient-classification systems are introduced. This confirms that our first hypothesis is consistent with our data: policy-makers are more likely to change when the existing policy does not perform well.

Figure 3 shows how learning effects vary over time (H3). The horizontal axis represents years, while the vertical axis represents the marginal effect of learning, that is, how the predicted probability of policy change varies when the experience of other countries shows that patient-classification sys-

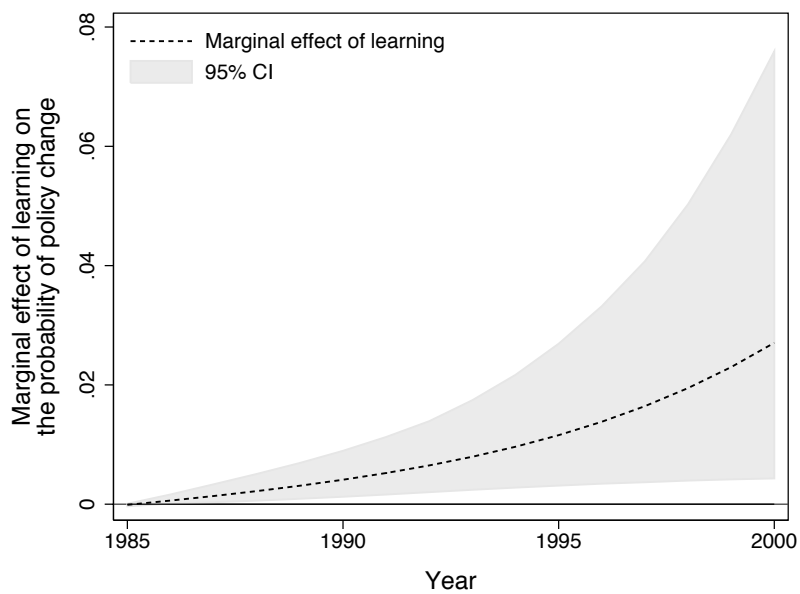


Figure 3: Marginal effect of learning on the probability of policy change.

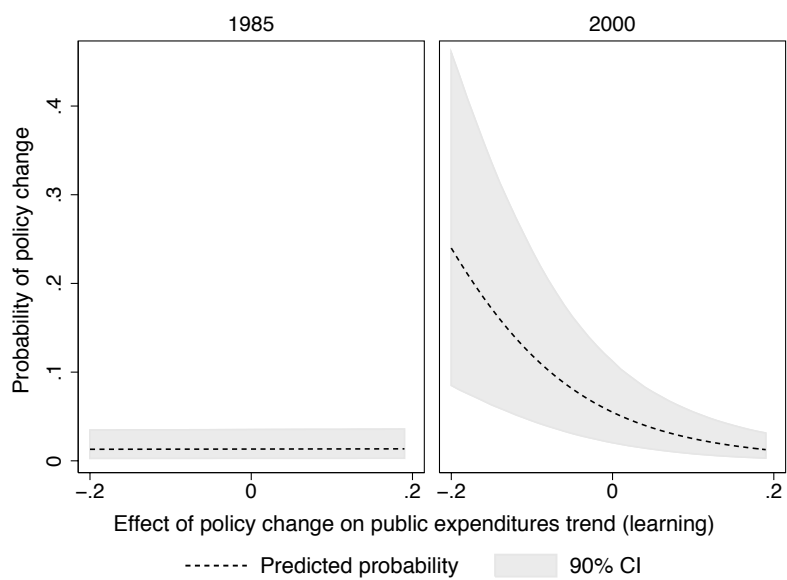


Figure 4: Predicted probability of policy change as a function of learning in 1985 and 2000.

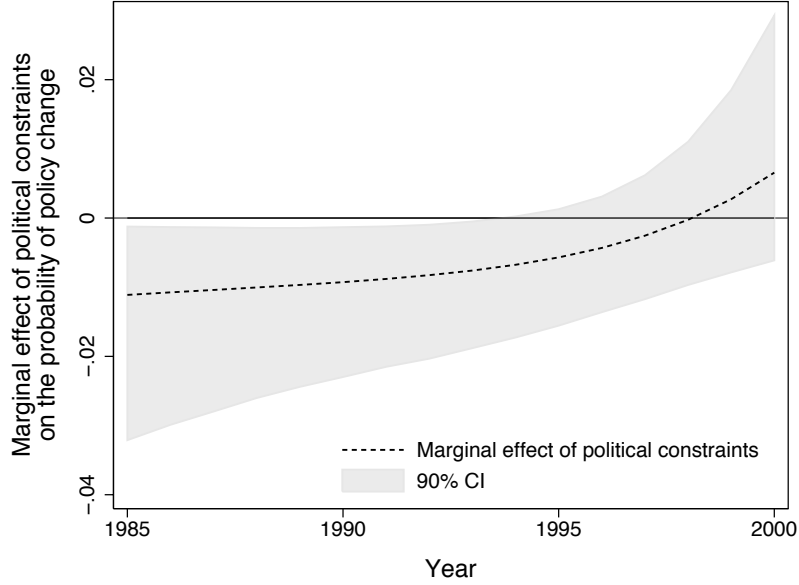


Figure 5: Marginal effect of political constraints on the probability of policy change.

tems lead to a slight decline in public expenditures on health (that is, the desired outcome) instead of a slight increase<sup>8</sup>. It can be seen that the impact of learning grows over time. Two points are noteworthy. First, our hypothesis on learning (H2) is confirmed: the adoption of patient-classification systems is more likely when the experience of other countries shows that this policy is linked to a reduction in public expenditures on health. It should be emphasized that here learning takes the uncertainty of the estimate of the relationship between policies and outcomes into account: it is therefore a strongly rational version. Second, while we hypothesized that learning effects may vary longitudinally (H3), our main expectation, based on sociological theory, was that they would decline over time. Figure 3 shows that the impact of learning does vary over time, but in fact it grows. This means that policy-makers are more sensitive to information supplied by the experience of others when a new policy is already somewhat widespread than when it is a fresh innovation. After all, it makes sense: policy-makers need not be instantly aware of policy innovations elsewhere, and it takes some time before a new policy comes on their radar screen. In addition, the experience of early

<sup>8</sup>More precisely, the vertical axis shows the predicted-probability change that occurs when, all else equal, the learning variable goes from 0.05 to  $-0.05$ , 0 being the situation where patient-classification systems have no effects on total expenditures.

adopters is inherently not very trustworthy: estimates of the relationship between policies and outcomes depend crucially on one or two cases, which could be outliers in some ways. Therefore, in a rational learning perspective it makes sense for policy-makers to wait until more evidence is available before making a decision. This interpretation is consistent with Figure 3.

The same result is shown also in Figure 4, which may be more intuitive since it represents how the predicted probability of policy change varies as a function of the experience of others, and this in two different years, one early and the other late in the process. In 1985, the experience of others did not matter. The probability of policy change is constant, and does not depend on whether public-expenditures trends are more favorable in countries that have adopted patient-classification systems. By contrast, in 2000 the experience of others matters a lot: the probability of policy change is about 20 times bigger if learning (which takes into account the uncertainty of the estimates) indicates that patient classification systems lead to a marked decrease in public expenditures on health than if it indicates that the reform is associated with a marked increase of expenditures. Therefore, we can conclude that patient-classification systems have spread in part following a learning process that seems to be more rational than the sociological literature expects: learning takes uncertainty into account and becomes more important as the diffusion process unfolds.

Finally, Figure 5 displays how the marginal effect of political constraints on the probability that patient-classification systems are introduced changes over time. Our hypothesis was that the more political constraints there are, the less likely policy change, but especially for innovators (H4). Figure 5 indicates that political constraints have a negative effect that declines over time. More precisely, it shows that the impact of political constraints on policy change is negative until about 1994, but is not significantly different from 0 afterwards. Early adopters are countries with fewer political constraints, but later in the process countries with more political constraints are also able to change policy. Political constraints, therefore, do not seem to block policy change altogether, but only to slow it. This is consistent with the nature of the reforms under study, namely legislative changes, where thus formal institutions matter, but on policies that are not highly politicized, which therefore are not impossible to pass in institutional contexts with many veto players. Overall, the story told by Figure 5 is consistent with our expectations: political constraints have a negative effect on policy change, but especially at the beginning of the process. Innovators tend to be countries that face relatively few political constraints. It should be stressed, however, that our findings on the role of political constraints are not entirely robust, as discussed earlier. They should therefore be treated with additional caution.

## 6 Conclusion

In this article, we have argued that welfare states are interdependent and, therefore, social policies diffuse cross-nationally. The results of our study of hospital financing reforms indicate that, although domestic factors matter, diffusion is also important in explaining the spread of patient-classification systems. More precisely, the decision to introduce these instruments is influenced by their performance abroad: their adoption is more likely when the experience of other countries shows that they lead to a milder rise, or a decrease, in public expenditures on health, and when the empirical evidence supporting this conclusion is more reliable. Therefore, a learning process seems to have characterized the spread of hospital financing reforms in OECD countries. Moreover, learning has acquired importance over time, suggesting that, as patient-classification systems have become more widespread, policy-makers have looked more closely at the consequences of this reform abroad. Overall, these findings constitute a strong confirmation of our main hypotheses.

Diffusion and learning matter, but this does not mean that country-specific factors are no longer relevant. Although the technical nature of patient classification systems means that partisan differences do not matter much, other domestic factors do. Reform is more likely when the existing system is not very effective: as public expenditures on health increase, so does the probability of policy change. Political institutions are also important. Institutional arrangements creating obstacles to policy change slow reforms down, but do not prevent them. We have found countries to be more likely to be innovators if their institutional environment is relatively veto-free, but polities characterized by more political constraints eventually catch up: they simply need more time.

These findings have implications for both the welfare state and diffusion literatures. For the former, the bottom line is that welfare states cannot be considered as separate entities. They are interdependent, and welfare state development and reform should be studied as such. This article has focused on learning, and we have taken policy outcomes (the trend in public expenditures on health) as the relevant consequence about which policy-makers learn. But of course, policy-makers are also interested in the *political* effects of policies. What are the chances that a reform can successfully be voted into law? And if this happens, will there be electoral rewards or backlash? Future work should certainly take these points into account, in particular when studying reforms that are more politicized than patient-classification systems. Labor market policies and pensions can be cases in point: in these domains the political consequences of reforms are highly relevant to policy-

makers.

For the diffusion literature, another implication of our analysis is that diffusion processes need not be unconditional. Most studies of learning have implicitly assumed that learning matters equally for all countries and time periods, and their results have been mixed (for example, Meseguer 2006a; Meseguer 2004; Elkins, Guzman, and Simmons 2006). By contrast, our findings suggest that learning effects can vary over time. Additionally, the experience of others could also play different roles according to the policy preferences or ideological orientation of policy-makers, especially when the reform has strong political connotations. Taking the heterogeneity of diffusion processes more seriously into account is therefore another relevant point for future research, especially for more fundamental welfare reforms, which are usually very controversial. Pensions and labor market policies, for instance, are areas where policy preferences and partisan politics can be expected to play a more important role, both independently and as filters of learning. Policies that work well abroad will not be easily adopted at home if they contrast with the preferences of policy-makers and/or if they are unpopular. Partisan politics, and domestic factors in general, are likely to be much more relevant in these contexts.

In addition, it would be interesting to examine the normative consequences of diffusion processes in the welfare state domain. Welfare policies diffuse, but is this a good or a bad thing? For instance, Volden and Cohen (2006) have shown that successful welfare reforms have spread across US states, but especially those that are successful in moving whites, rather than blacks, off welfare, an outcome that many would see as unjust. What are the consequences of the international diffusion of (welfare) policies? Very little is known on this important issue.

We would also like to stress the importance of taking decisions rather than aggregate figures such as spending as the dependent variable for diffusion analyses. Recently, Hacker (2004b) has forcefully stressed that non-decisions (like the lack of adaptation to a new socio-economic context) matter at least as much as decisions in the development of welfare states, but the literature has actually never been very focused on decisions. Rather, it has relied heavily on aggregate figures of spending, which constitute the dependent variable of an overwhelming majority of quantitative studies. Recent efforts have tracked the evolution of welfare state arrangements through better measures, but the dependent variable remains an aggregate figure, such as social citizenship rights (Korpi and Palme 2003) or income replacement rates (Allan and Scruggs 2004). While these dependent variables make perfect sense if we are interested in retrenchment and its determinants, they are less useful in a diffusion context. Expenditures and replacement rates are cer-

tainly influenced by decisions, but also by a host of other factors; conversely, decisions may be important despite their lack of effects on expenditures, or need not translate immediately into observable effects on expenditures or replacement rates. Therefore, diffusion studies of the welfare state should focus on decisions as the dependent variable more than on expenditures or other aggregate figures.

In conclusion, diffusion matters for the development of the welfare state, and studying national reforms as if they were independent of each other (the implicit assumption of the overwhelming majority of studies) is becoming increasingly implausible.

## References

- Allan, J. P. and L. Scruggs (2004). Political partisanship and welfare state reform in advanced industrial societies. *American Journal of Political Science* 48(3), 496–512.
- Armington, K., P. Leimgruber, M. Beyeler, and S. Menegale (2005). Comparative political dataset, 1960–2003. University of Bern.
- Beck, N. and S. Jackman (1998). Beyond linearity by default: Generalized additive models. *American Journal of Political Science* 42(2), 596–627.
- Beck, N., J. N. Katz, and D. J. Tucker (1998). Taking time seriously: Time-series cross-section analysis with a binary dependent variable. *American Journal of Political Science* 42(4), 1260–1288.
- Berry, W. D. and B. Baybeck (2005). Using geographical information systems to study interstate competition. *American Political Science Review* 99(4), 505–519.
- Berry, W. D., R. C. Fording, and R. L. Hanson (2003). Reassessing the ‘race to the bottom’ in state welfare policy. *Journal of Politics* 65(2), 327–349.
- Box-Steffensmeier, J. M. and B. S. Jones (2004). *Event History Modeling. A Guide for Social Scientists*. Cambridge: Cambridge University Press.
- Box-Steffensmeier, J. M. and C. Zorn (2002). Duration models for repeated events. *Journal of Politics* 64(4), 1069–1094.
- Brady, D., J. Beckfield, and M. Seeleib-Kaiser (2005). Economic globalization and the welfare state in affluent democracies, 1975–2001. *American Sociological Review* 70, 921–948.

- Brambor, T., W. R. Clark, and M. Golder (2006). Understanding interaction models: Improving empirical analyses. *Political Analysis* 14, 63–82.
- Braun, D. and F. Gilardi (2006). Taking ‘Galton’s problem’ seriously: Towards a theory of policy diffusion. *Journal of Theoretical Politics* 18(3), 298–322.
- Braun, D., F. Gilardi, K. Füglistner, and S. Luyet (2007). Ex pluribus unum: Integrating the different strands of policy diffusion theory. *Politische Vierteljahresschrift* (Special issue), 39–55.
- Brooks, S. M. (2005). Interdependent and domestic foundations of policy change: The diffusion of pension privatization around the world. *International Studies Quarterly* 49, 273–294.
- Brooks, S. M. (2007). When does diffusion matter? explaining the spread of structural pension reforms across nations. *Journal of Politics* 69(3), 701–715.
- Collier, D. and R. E. Messick (1975). Prerequisites versus diffusion: Testing alternative explanations of social security adoption. *American Political Science Review* 69, 1299–1315.
- Elkins, Z., A. Guzman, and B. Simmons (2006). Competing for capital: The diffusion of bilateral investment treaties, 1960–2000. *International Organization* 60(4), 811–846.
- Franzese, R. J. and J. C. Hays (2006). Strategic interaction among EU governments in active labor market policy-making: Subsidiarity and policy coordination under the European employment strategy. *European Union Politics* 7(2), 167–189.
- Gilardi, F. (2005). The institutional foundations of regulatory capitalism: The diffusion of independent regulatory agencies in western Europe. *Annals of the American Academy of Political and Social Sciences* 598, 84–101.
- Hacker, J. S. (2004a). Dismantling the health care state? Political institutions, public policies and the comparative politics of health reforms. *British Journal of Political Science* 34, 693–7724.
- Hacker, J. S. (2004b). Privatizing risk without privatizing the welfare state: The hidden politics of social policy retrenchment in the United States. *American Political Science Review* 98(2), 243–260.
- Hannan, M. T. and G. R. Carroll (1992). *Dynamics of Organizational Populations. Density, Legitimation, and Competition*. Oxford: Oxford



University Press.

- Henisz, W. J. (2000). The institutional environment for multinational investment. *Journal of Law, Economics, and Organization* 16(2), 334–364.
- Henisz, W. J. (2002). The institutional environment for infrastructure investment. *Industrial and Corporate Change* 11(2), 355–389.
- Henisz, W. J., B. A. Zelner, and M. F. Guillén (2005). The worldwide diffusion of market-oriented infrastructure reform, 1977-1999. *American Sociological Review* 70(6), 871–897.
- Jahn, D. (2006). Globalization as ‘Galton’s problem’: The missing link in the analysis of diffusion patterns in welfare state development. *International Organization* 60, 402–431.
- Jordana, J. and D. Levi-Faur (2005). The diffusion of regulatory capitalism in Latin America: Sectoral and national channels in the making of new order. *Annals of the American Academy of Political and Social Sciences* 598, 102–124.
- King, G., M. Tomz, and J. Wittenberg (2000). Making the most of statistical analyses: Improving interpretation and presentation. *American Journal of Political Science* 44(2), 341–355.
- Korpi, W. and J. Palme (2003). New politics and class politics in the context of austerity and globalization: Welfare state regress in 18 countries, 1975-1995. *American Political Science Review* 97(3), 425–446.
- Lee, C. K. and D. Strang (2006). The international diffusion of public-sector downsizing: Network emulation and theory-driven learning. *International Organization* 60(4), 883–909.
- McNamara, K. R. (2002). Rational fictions: Central bank independence and the social logic of delegation. *West European Politics* 25(1), 47–76.
- Meseguer, C. (2004). What role for learning? The diffusion of privatisation in oecd and Latin American countries. *Journal of Public Policy* 24(3), 299–325.
- Meseguer, C. (2005). Policy learning, policy diffusion and the making of a new order. *Annals of the American Academy of Political and Social Sciences* (598), 67–82.
- Meseguer, C. (2006a). Learning and economic policy choices. *European Journal of Political Economy* 22, 156–178.
- Meseguer, C. (2006b). Rational learning and bounded learning in the diffusion of policy innovations. *Rationality and Society* 18(1), 35–66.

- Meyer, J. W. and B. Rowan (1977). Institutionalized organizations: Formal structure as myth and ceremony. *American Journal of Sociology* 83(2), 340–363.
- OECD (2006). OECD health data 2006. OECD, Paris.
- Pierson, P. (2001a). Coping with permanent austerity: Welfare state restructuring in affluent democracies. In P. Pierson (Ed.), *The New Politics of the Welfare State*, pp. 410–456. Oxford: Oxford University Press.
- Pierson, P. (Ed.) (2001b). *The New Politics of the Welfare State*. Oxford: Oxford University Press.
- Pierson, P. (2001c). Post-industrial pressures on the mature welfare states. In P. Pierson (Ed.), *The New Politics of the Welfare State*, pp. 80–104. Oxford: Oxford University Press.
- Polillo, S. and M. F. Guillén (2005). Globalization pressures and the state: The worldwide spread of central bank independence. *American Journal of Sociology* 110(6), 1764–1802.
- Simmons, B., F. Dobbin, and G. Garrett (2006). Introduction: The international diffusion of liberalism. *International Organization* 60(4), 781–810.
- Simmons, B. A. and Z. Elkins (2004). The globalization of liberalization: Policy diffusion in the international political economy. *American Political Science Review* 98(1), 171–189.
- Strang, D. and S. A. Soule (1998). Diffusion in organizations and social movements: From hybrid corn to poison pills. *Annual Review of Sociology* 24, 265–290.
- Swank, D. (2006). Tax policy in an era of internationalization: Explaining the spread of neoliberalism. *International Organization* 60(4), 847–882.
- Tsebelis, G. (2002). *Veto Players: How Political Institutions Work*. Princeton: Princeton University Press.
- Volden, C. (2006). States as policy laboratories: Emulating success in the children’s health insurance program. *American Journal of Political Science* 50(2), 294–312.
- Volden, C. and C. Cohen (2006). The diffusion of successful tanf policies. Unpublished manuscript, Ohio State University.